

EM-RFO--KHLL-779OPS-1999-0006 FINAL

779 Operations
(Name of Facility)

Plutonium Processing and Handling
(Facility Function)

Rocky Flats Env. Technology Site Kaiser-Hill Company, L.L.C.
(Site) (Contractor)

Name: E. P. Schweinsberg
Title: Work Authorization Team Manager **Telephone No.:** (303) 966-5839
(Facility Manager/Designee)

Name: MOTT, DEBRA L
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Name: T. J. Kehoe **Date:** 07/29/1999
(Authorized Classifier (AC))

1. Occurrence Report Number: EM-RFO--KHLL-779OPS-1999-0006

D&D Worker in Building 779 Received Finger Laceration While Working in Glovebox 955 in Room 133

2. Report Type and Date: FINAL

	Date	Time
Notification:	02/03/1999	15:07 (MTZ)
Initial Update:	03/18/1999	14:05 (MTZ)
Latest Update:	07/29/1999	16:58 (MTZ)
Final:	09/13/1999	15:42 (MTZ)

3. Occurrence Category: Unusual

4. Number of Occurrences: 1 **Original OR:**

5. Division or Project: Kaiser-Hill Company, L.L.C.

6. Secretarial Office: EM - Environmental Management

7. System, Bldg., or Equipment: Building 779, Glovebox 955, Room 133

8. UCNI?: No

9. Plant Area: Building 779

10. Date and Time Discovered: 02/02/1999 10:05 (MTZ)

11. Date and Time Categorized: 02/02/1999 13:00 (MTZ)

12. DOE HQ OC Notification:

Date	Time	Person Notified	Organization
02/02/1999	14:10 (MTZ)		M.Wyatt, DOE HQ DOE

13. Other Notifications:

Date	Time	Person Notified	Organization
02/02/1999	10:06 (MTZ)		J. Sondag, DOE Fac Rep DOE/RFFO
02/02/1999	14:30 (MTZ)		A. Reed, ON&R RMRS
02/02/1999	14:33 (MTZ)		E. Kray, CDH Rep CDHPE

14. Subject or Title of Occurrence:

D&D Worker in Building 779 Received Finger Laceration While Working in Glovebox 955 in Room 133

15. Nature of Occurrence:

04) Personnel Radiological Protection
B. Personnel Contamination

16. Description of Occurrence:

On February 2, 1999, at approximately 1005 hours, a Decontamination and Decommissioning (D&D) worker was performing size reduction activities in glovebox 955 in Room 133. He was making cuts on an interior piece of furnace with a port-a-band saw. While moving the saw into position for the next cut, he held the saw with his right hand on the handle that contained the trigger. He placed his left hand on the other end of the saw that has a wheel type mechanism that turns the saw blade. He accidentally hit the trigger and the blade caught the top of his left index finger and cut it.

The Radiological Control Technician (RCT) immediately notified the Building 779 Configuration Control Authority (CCA) and assisted the employee in exiting the room. Due to the severity of the injury the only surveys performed at that time was on the glovebox glove. The count on the glovebox glove was 25,000 counts per minute (cpm). Because medical treatment takes precedence over radiological considerations, the employee was not frisked at this time. The hand with the

laceration was placed in a bag and taped at the employees wrist, for transporting of the employee to Occupational Medicine.

The Building 779 CCA contacted Fire Dispatch, an ambulance was dispatched and the employee was transported to Occupational Medicine. Upon arrival at Occupational Medicine, before exiting the ambulance, the anti-contamination clothing was cut off of the injured employee. At this point, all assisting personnel and the modesty clothing of the injured employee was surveyed with no contamination being found. At Occupational Medicine, the latex glove on the hand with the laceration was found to have 10,000 disintegrations per minute (dpm) per 100 centimeters squared (100cm²) alpha contamination using the Electra. After the first attempt at decontaminating the wound, the survey results indicated 420 dpm/100cm². At this time, a wound count was performed. The first count was 41 nanocuries (nCi) alpha. One nCi is equal to approximately 2220 dpm/100cm². Occupational Medicine decontaminated the wound again and a reading of 30.5 nCi was detected. A decision was made by Medical to offer the patient Diethylenetriaminepentaacetate (DTPA), a chelating treatment. The employee consented to the chelation treatment. The wound continued to be decontaminated in an effort to reduce the contamination as far as possible. The physician at Medical determined it would be necessary to excise the laceration.

Upon further examination, Medical personnel found a tendon that appeared to have been damaged. As a precaution, prior to incising, it was determined that a Hand Specialist would be consulted. The injured employee, two RCTS, a foreman, and the physician transported the employee offsite for the laceration to be evaluated. The tendon was repaired and sutured by the offsite Hand Specialist. The employee returned to site and was released with restrictions.

He was instructed to return to Occupational Medicine for further evaluation on Wednesday, February 03, 1999.

17. Operating Conditions of Facility at Time of Occurrence:

Normal operating conditions existed

18. Activity Category:

03 - Normal Operations (other than Activities specifically listed in this Category)

19. Immediate Actions Taken and Results:

The Radiological Control Technician (RCT) immediately notified the Building 779 Configuration Control Authority (CCA) of the injury. The Building 779 CCA contacted Fire Dispatch requesting an ambulance for transportation of an injured

employee to Medical. The RCT removed the injured employee from the Contamination Area. The employee was transported to Occupational Medicine.

A Fact Finding Meeting was held on February 2, 1999.

20. Direct Cause:

- 8) Radiological/Hazardous Material Problem
 - A. Legacy Contamination

21. Contributing Cause(s):

- 4) Design Problem
 - A. Inadequate Work Environment

22. Root Cause:

- 3) Personnel Error
 - A. Inattention to Detail

23. Description of Cause:

Due to the limited cause codes available in ORPS, the direct cause of this occurrence was attributed to Radiological Material Problem, Legacy Contamination. Preliminary results of the count of the wound using Internal Dosimetry's low-background, high-purity germanium detectors were determined to be:

Plutonium 1.58 plus/minus 0.94 nCi Americium 241 0.44 plus/minus 0.031 nCi

On July 6, 1999, Internal Dosimetry issued an interim dose assessment. The Committed Effective Dose Equivalent (CEDE) resulted in 3,100 millirem (mrem) and the Maximum Committed Organ Dose Equivalent (Bone Surfaces) resulted in 56,000 mrem. Due to the administration of DTPA the urine sample results collected prior to April 8, 1999 were not used in this assessment. The urine sample results collected after April 8, 1999 and three fecal samples collected in February 1999 were used to calculate the intake and resulting dose.

These doses are based on the internal deposition received as a result of this intake and do not include doses received from other intakes or external radiation exposures. The doses will be assigned to the 1999 calendar year. A final report will be issued after the results from the samples collected for one year after the wound have been received. This information will be maintained by the Internal Dosimetry Department.

The root cause of this occurrence was determined to be Personnel Error, Inattention to Detail. The employee was performing size reduction activities inside Glovebox 955 in Room 133. He was preparing to make another cut. He needed to move the saw approximately six inches. The worker gripped the saw with one hand on the blade area and one hand on the start button. As the worker moved the saw, his hand accidentally pushed the start button, cutting his left index finger which was on the blade. As a corrective action (#1), all work was stopped in Buildings 779 and 771 to review this incident with hourly personnel. Topics addressed were proper precautions and use of hand tools, fatigue while operating tools and increased awareness needed for use of the Buddy System.

A contributing cause of this occurrence was Design Problem, Inadequate Man-Machine Interface.

As a corrective action (#2), the project's power tools will be evaluated for improvements. Tools that can be replaced with new ones that have safety switches will be replaced. The possible installation of a second switch on all power tools was evaluated. According to the manufacturer of the tools being used on the project, tooling with double switches does not exist. The use of counter weights and suspension to assist with tool handling will be evaluated. Alternate cutting techniques will be reviewed. A subcontract engineering firm has been contracted to develop a suspension system and alternate tooling and cutting techniques. Painting handles for proper hand location on power tools was evaluated and determined no value would be added.

The job hazard analysis was revised to include requirements for appropriate hand protection for all size reduction activities (corrective action #3).

As a corrective action (#4), Kevlar, cut resistant, gloves were purchased and are required when performing cutting operations.

24. Evaluation (by Facility Manager/Designee):

This occurrence did not have any adverse effects on other plant or other building safety systems. The D&D workers and RCTs performed all necessary actions in an outstanding manner which minimized the risk of further contamination spread. Management initiated an investigation with subject matter experts to develop actions to reduce the risk to employees.

The employee was restricted from the Radiological Control Area for the remainder of 1999.

The Kaiser-Hill Team is taking this incident very seriously. Our top goal is doing the work safely and keeping our worker exposures as low as we can while still accomplishing the important risk-reduction work at the Site.

25. Is Further Evaluation Required?: No

26. Corrective Actions (* = Date added/revised since final report was approved.)

1. Invoke work stoppage in Buildings 779 and 771 to review this incident and power tool precautions. Responsibility: Kelly Trice

Target Completion Date: 02/03/1999 **Completion Date:** 02/03/1999

2. Evaluate the possible installation of a second switch on all power tools. Responsibility: Rick Caulfield

Target Completion Date: 03/31/1999 **Completion Date:** 03/15/1999

3. Evaluate the job hazard analysis to determine if it is specific enough for glovebox size reduction activities. Responsibility: Mark Zachary

Target Completion Date: 02/03/1999 **Completion Date:** 02/03/1999

4. Evaluate the use of Kevlar gloves when making cuts. Responsibility: Rick Caulfield

Target Completion Date: 02/28/1999 **Completion Date:** 02/25/1999

27. Impact on Environment, Safety and Health:

Preliminary results of the count of the wound using Internal Dosimetry's low-background, high-purity germanium detectors were determined to be:

- Plutonium 1.58 plus/minus 0.94 nCi - Americium 241 0.44 plus/minus 0.031 nCi

The following is the interim dose assigned by Internal Dosimetry:

Committed Effective Dose Equivalent (CEDE) 3,100 mrem Maximum Committed Organ Dose Equivalent (Bone Surfaces) 56,000 mrem

A final report will be issued after the results from the samples collected for one year after the wound have been received. The final dose will be maintained through the Internal Dosimetry Department.

Radiological surveys and samples from monitoring equipment confirm that there has been no impact to the environment, and the health and safety of the public and plant personnel was not threatened.

28. Programmatic Impact:

No significant programmatic impact occurred. A single day schedule slip occurred; however, it has since been recovered. There was no loss of data, or other measurable consequences resulting from this occurrence.

29. Impact on Codes and Standards:

This occurrence did not affect the requirements of national codes, standards, program standards or DOE Orders.

30. Lessons Learned:

This incident shows the potentially high level of risk involved with the dismantlement of a nuclear facility and highlights the need to expedite plans to move toward remote robotics technology for as much of our equipment size reduction work as possible. An improved method to engineer this work must be developed so that workers are removed from immediate work place hazards.

31. Similar Occurrence Report Numbers:

RFO--KHLL-779OPS-1998-0029

32. User-defined Field #1:

990065

33. User-defined Field #2:

07/31/99

34. HQ Keyword(s):

06D--Radiological Issues - Exposure (Stop Jan 99) 08E--OSHA/Industrial Hygiene Issues - Injury 11K--Other - Maintenance (Start Dec 97)

35. HQ Summary:

36. DOE Facility Representative Input:

37. DOE Program Manager Input:

38. Approvals:

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